



BUILDING IN ALASKA

Tips on Insulating an Existing House

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Richard D. Seifert
Energy Specialist

Insulating a house after it has been built is more expensive than insulating as it is being built. It is rather difficult to justify adding insulation to an existing home purely on a basis of reducing heating costs. However, it can usually be justified on the basis of improving the comfort of the home, reducing condensation maintenance costs and conserving national energy supplies. Suggestions for improving the insulation value of your home follow.

Ceiling

Lack of ventilation and vapor barrier in the ceiling is often evident by moisture stains and water leaking out of electrical outlets during the spring thaw. Glaciering at the eaves is another sign that warm air is leaking into the roof cavity or that it is inadequately insulated.

The following steps should be taken if additional insulation is installed in the ceiling.

1. Lift the existing insulation and check for the existence of a vapor barrier. The vapor barrier usually consists of a clear sheet of polyethylene (Visqueen). Older houses may have a double sheet of rosin paper cemented to an asphalt coating. Sometimes the rosin paper may be coated on one side with a thin sheet of aluminum foil. The vapor barrier must be securely fastened under the ceiling joists to be effective. The aluminum foil cemented onto a rock lath is not adequate because the joints are not sealed.
2. If there is no vapor barrier evident, then a vapor barrier must be installed before placing any type of insulation. Vapor barriers may be installed using the following guidelines.
 - a. There is no satisfactory technique for installing and sealing a polyethylene sheet between the joists. If urethane is used without an additional vapor barrier, specification of water vapor permeability of the urethane should be provided by the applicator in writing. It is best to use a polyethylene vapor barrier for urethane foam applications.



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- b. If any loose fill (cellulose, mineral wool, fiberglass) insulation is used, a 6-mil polyethylene sheet must be installed on the underside of the ceiling and sealed along the seams and edges with non-hardening caulking compound. Then, 1 inch x 2 inch nailers should be installed under the vapor barrier. These may be covered with acoustical tile or sheet rock.
- c. Where possible, all openings around plumbing vent stacks, plumbing walls, electrical wiring, lighting fixtures and chimneys should be tightly sealed against water vapor and air migration into the roof cavity. Recessed lighting fixtures should be removed and the opening tightly sealed against warm air and water vapor leakage.
- d. All access openings and stair wells from the interior of the house into a cold roof cavity or attic should be tightly sealed against migration of warm air and water vapor. Access openings into a cold attic should be placed in the gable ends of the roof rather than in the ceiling.
- e. When placing additional insulation in the roof cavity, special precautions must be taken not to restrict air movement over the insulation at the eaves, particularly with trusses constructed of 2 inch x 4 inch top and bottom chords. It may be desirable to place a 2 inch x 24 inch strip of rigid urethane under the eaves instead of blanket, batt or fill insulation. New products are available for this purpose, also.
- f. The plate (top) of interior partitions should be vapor proofed with vapor resistant paint and the edges sealed with caulking, when no other vapor protection has been provided.

Stud Frame Wall

Lack of insulation in a wall may be evident by blistering of paint on exterior siding, frost or condensation behind furniture and drapes, or staining of sheet rock nailheads.

Follow the steps listed below to insulate an existing wall.

1. Remove a section of exterior siding and sheathing in several locations and determine if the wall is

insulated and/or vapor proofed. No insulation should be blown into the wall until it is properly vapor proofed.

2. The wall may be vapor proofed by installing a 6-mil polyethylene sheet over the existing interior wall covering. The vapor barrier should be sealed at all edges and seams. The polyethylene may be covered with sheetrock or paneling.
3. The interior of the wall may also be vapor proofed by a vapor resistant wallpaper. Regular vinyl wallpaper may be waterproof and washable, but not necessarily vapor proof. The permeability should be specified by the manufacturer and not be greater than 0.750 perms.
4. After the wall has been properly vapor proofed, mineral wool may be blown into the wall through 1 ½ -inch to 2-inch plugs cut through the exterior siding and sheathing in every cavity between the studs. Cavities under windows should also be insulated.
5. A more expensive and drastic method is to remove all interior wall covering, place 3½ inches of fiberglass between the studs, cover with 6 mil polyethylene and then install new sheet rock or paneling.

Basement

An uninsulated basement can cause a large portion of the heat loss in a house. Heat loss may be evident by melting of snow along the foundation wall.

The following steps may be taken to insulate a basement of an existing house.

1. The basement of an existing house may be insulated from within by installing 2 inch x 4 inch nailers at 16-inch centers on the wall. Place 2 or 3½ inches mineral wool insulation between the nailers. Over this place a 6 mil polyethylene vapor barrier. The vapor barrier may be covered with sheet rock and suitable paneling.
2. Foamed plastic may be sprayed between the nailers. However, a polyethylene vapor barrier should be placed over the insulation and nailers. Also, rigid foam plastic insulation board may be used.

Closed Crawl Spaces

A masonry crawl space of a home can account for 45 per cent of the heat loss depending on the temperature required to maintain a warm floor surface temperature. Heat loss is often evident by melting of snow along the foundation wall.

The guidelines below may be used to insulate a closed crawl space.

1. Excavate a trench along the wall to the depth of the footer for placement of insulation. Attach a 2 inch rigid polystyrene or urethane board on the interior of the masonry or concrete foundation wall. Sprayed-on urethane may also be used on the exterior of the foundation, as can extruded polystyrene.
2. The foundation vents should be replaced with adjustable units that can be closed in winter and opened in summer.
3. For additional comfort and fuel savings, the floor of the crawl space may be covered with a 2 inch layer of rigid polystyrene. A 6 mil polyethylene vapor barrier should be placed under the insulation. The insulation should be covered with 4-to 6-inches of sand and gravel. This system also can aid in reducing radon induction into a crawlspace or basement.

Floors Over Unheated Crawl Spaces

A floor over an unheated crawl space should be provided with as much or greater insulation than the ceiling, since it is the closest surface upon which we work, play and relax during waking hours. However, it is still not possible to attain an ideal floor temperature without installing insulated skirting around the foundation, which must be done with extreme caution in permafrost zones.

Slab-On-Grade

Slab-on-grade is not recommended for Alaska except in a basement. Insulating the floors and foundations of a house with a concrete floor is difficult at best. Ideally, in a new home, the perimeter of the floor area should be insulated with at least 2 inches of polystyrene or urethane, with a 48 inch strip laid around the perimeter. It is very costly to provide sufficient heat to raise the floor surface temperature comparable to room air temperature.

A cold floor results in stratification of air such that the thermostat must be set at 75° F to maintain a comfortable temperature at the floor. This can result in temperatures near the ceiling as high as 85° F. (See also the *Manual on Frost Protected Shallow Foundation Systems* noted on page 4.)

The following steps may be taken to insulate the foundation wall of a slab-on-grade house.

1. Excavate a trench around the perimeter of the house and install 2 inches vapor resistant extruded polystyrene high density board. The insulation should extend at least 32 inches below the surface. Foamed-in-place urethane is excellent, but it necessitates excavating a 4 foot wide trench to assure uniform foaming of insulation by the applicator. A rigid urethane or polystyrene board only requires a 1 foot wide trench to place the insulation. The foam plastic insulation above grade should be plastered or in some way protected against deterioration by ultraviolet light of the sun and mechanical damage by rodents, dogs and other pests.
2. A floating slab should be insulated by placing rigid insulation along the edges.

To insulate an existing concrete slab-on-grade, the following steps may be taken.

1. Install 2 inch x 3 inch or 2 inch x 4 inch treated (all weather wood) sleepers over the existing slab. A ¾ inch space should be left at the ends of sleepers to allow for possible expansion due to moisture adsorption.
2. The space between the sleepers may be insulated with 2 inches of polystyrene or urethane rigid board or foamed-in-place urethane.
3. A wood subfloor and/or finish flooring should be placed over the nailers. A ¾ inch clear space should be left around the perimeter of the subfloor and finish flooring to allow for possible expansion. A ¼ inch opening should be left behind or under the base molding to facilitate natural removal of water vapor that may condense out under the floor, particularly during summer when the heat may be turned off.

Exterior Retrofit of Vapor-Sealed Insulation

Insulation products with low water-vapor permeability are used for exterior retrofit of insulation, especially in conjunction with aluminum-siding installations. These insulations include closed-cell polystyrene foams and foil-faced plastic foams which are usually available in 2 foot x 8 foot or 4 foot x 8 foot sheets. Both types of insulation are excellent vapor barriers and, therefore, must be applied with special precautions to the exterior of structures. Otherwise, moisture could accumulate in the wall and be trapped by this new exterior vapor barrier.

Refer to manufacturer's recommended installation procedures whenever you use these types of insulation, and contact the Cooperative Extension Service at 1-800 478-8324 for further information.

The following Cooperative Extension Service publications are suggested:

EEM-00258, *Heat Loss Coefficients of Building Material*

EEM-00456, *Warm Floors are Essential for Comfort*

HCM-00559, *Attics & Roofs for Northern Residential Construction*

HCM-00952, *Special Considerations for Building in Alaska*

HCM-01552, *Retrofit Insulation in Wood Roofs*

HCM-01553, *Retrofit Insulation in Concrete and Masonry Walls*

HCM-01554, *Retrofit Insulation in Existing Wood Walls*

EEM-01252, *Caulks and Sealants*

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